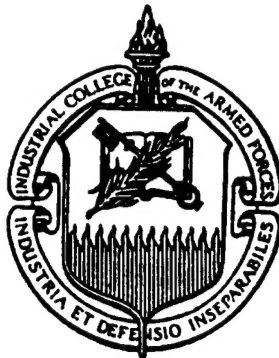


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Etiology of an Intelligence Estimate

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The major reference sources for this paper are not listed with the books and articles. They were the generous group of intelligence professionals who agreed to speak with me about this subject. They freely discussed ideas, argued, and reviewed information in support of this project. They openly shared their experiences, their criticisms and their kudos for the organizations in which they worked, and invariably they displayed a positive attitude toward fostering improvement. Many of their ideas and thoughts have been written into the paper. Because I did not want to tie their names to anything in the paper that someone may find objectionable, they are not named directly, nor will they be. But their selfless contributions are acknowledged and appreciated. It is to them and their difficult work on behalf of our country that this paper is respectfully dedicated.

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ETIOLOGY OF AN INTELLIGENCE ESTIMATE

Issues and Solutions

This study deals with improving one of the United States defense intelligence community's most important tasks - assessments of potentially hostile nations' future force capabilities. It is dedicated to the premise that intelligence can do a better job of meeting customers' needs for future estimates despite being in an era of significantly restricted budgets and reduced personnel. The approach taken is somewhat unique compared to most current literature about improving intelligence. Most, like the recent report by the Commission on the Roles and Capabilities of the US Intelligence Community, dated March 1, 1996, look at block diagrams and organizational charts to figure out better functional layouts. Other views, like General Kroesan's comments, take the customer's perspective as their approach to improve intelligence. By contrast, this study looks at the internal intelligence process that produces estimates. This approach focuses on improving the internal ways futures estimates are done. The emphasis here is directly upon improving the process and the product, not on reorganizing the institutions.

The need for improvement is clear, but changes must take place in the overall context of the governmental system, and beginning with the internal process is a promising approach because it offers real potential regardless of how the organizational charts are drawn. And if those internal changes are properly made, they offer the potential for eliminating the need to redraw some organizational lines.

Today's intelligence process is a result of budget driven cuts applied to a system which focused on the Soviet Union of a half-century. The first section of the paper

dealings with the Soviet legacy and resulting problems in today's intelligence environment. Next, a different framework for doing intelligence work in this multi-polar world is proposed, including solutions based upon the New Sciences of Chaos and Complexity. Finally, specific recommendations and conclusions are proposed about where we are and where we need to go in the future.

The Environment Today

Today's Futures Estimates - What are they?

Structured, country estimates dealing with future force capabilities are often called "futures". They are produced under the DOD Futures Intelligence Program, universally referred to as "DODFIP". Futures Estimates normally postulate what types of weapons systems and what specific numbers of weapons countries will possess each year in the future. Usually, they are organized into the basic areas of Army, Navy, and Air Force units as appropriate for the country in question. An unclassified, generic example can be seen in Appendix H of the Defense Intelligence Management Document entitled Department of Defense Futures Intelligence Program (DODFIP) Standard Operating Procedures for Generating Force Projections and Futures Studies. Dated July 1996, it shows columns of numbers, by year, under headings like "Fixed Wing Aircraft," and "Principal Surface Combatants." It also displays additional types of information such as major bases, unit subordination reports, and total equipment categories that are also normally included.

Why are Futures Estimates Important and How do They Fit?

Country estimates about future capabilities are extremely important because they are basic, foundational building blocks of military acquisitions and planned force structure. Our procurement system is threat driven, so threat estimates are a basic consideration as DOD works to envision, design, procure and eventually implement a future force structure. DODFIP products are a key underlying basis for budget, performance, and schedule considerations in defense procurement. They are used to establish program requirements, define performance specifications, and perform trade-off analyses.

Threats are certainly not the only basis for acquisition decisions. Beyond cost, other concerns such as generic capability requirements, industrial base considerations, and technological developments also weigh in defense decisions. And, in the final analysis, our logistics system has been characterized as a political process. (Brandt and A'Hearn 2) However, at the most elementary level, programs are justified by how they compare to the threat, and DODFIP products define that threat.

The DODFIP process is designed to be collaborative because it is geared to produce estimates that have been considered by all the appropriate service departments. Under the Defense Intelligence Agency (DIA) direction, the DODFIP process brings together experts for the country in question from all appropriate service intelligence agencies. These experts meet as needed in accordance with the customer priority requirements, and they develop an estimate for the specified time period. A multi-step review process involving increasingly senior leadership is in place to ensure senior

understanding and concurrence. The process includes ways to resolve or at least voice disputes and iron out disagreements. The result is a single, authoritative futures document describing the projected armed forces of the specified country produced by the entire defense intelligence community. The projection is normally sent to the customer in print and electronically over appropriate intelligence information networks. It is considered the single source reference until superseded.

A remarkable aspect of futures estimates is the relative importance they can have compared with what they cost to produce. A good country assessment can be produced comfortably in a regular production cycle - scheduled, written, reviewed, coordinated, published, and distributed - in less than a year. It can be completed "out of cycle" in substantially less time providing it receives sufficiently high level direction and community emphasis. So it doesn't take particularly long. And it doesn't cost a significant amount, provided one stipulates that some type of intelligence system already exists. With the sunk costs paid, and with small marginal costs to bring analysts together to produce the estimate, the total costs are minimal. On the other hand, effected programs and their associated costs can be monumental.

While it is important to remember that threat estimates are only one of many criteria used in making procurement decisions, expected threats levels can have tremendous impacts on any program. And those programs can be huge. Deciding what to produce, then actually producing, fielding, making operational, and maintaining systems can involve thousands of people working for years. The costs can easily be in the hundreds of billions of dollars. For example, the costs associated with the Joint Advanced Fighter (JAF) program have been estimated to be in the range of three-

quarters of a *trillion* dollars. (Brandt and A'Hearn 5) That is a lot of money even for the US, and especially when declining defense budgets must also support ongoing operations plus other procurement programs. Since program justifications depends upon perceived threats, among other reasons, the importance of a relatively tiny group responsible for such estimates is clear. This is particularly true in the area of performance tradeoffs.

Aircraft designers, among others, balance and tradeoff performance characteristics, levels of technological sophistication, materials, and costs as needed depending on the expected threat environment for the aircraft. If futures estimates envision a particularly dangerous environment, then extra costs will be incurred to make the aircraft more survivable. On the other hand, if estimates don't show significantly increased threats over present levels, then costs can be held down by reducing mission requirements. In extreme cases, if estimates project extremely hostile conditions, then an entirely new approach may be needed rather than a new version of an existing system. Conversely, if intelligence estimates show a sufficiently benign environment, the program's entire existence could come into question.

Threat considerations are certainly not the only reason to initiate programs. Today, new programs are being initiated because the existing systems are reaching their useful lifetime limits. For example, according to Secretary of Defense Perry's recent report to Congress, the average age of the fighter aircraft fleet is projected to increase significantly because new aircraft are not being introduced to replace the old. At their current high tempo rates, the fleet is being worn out thereby making replacement inevitable regardless of threats. Similarly, political considerations can have huge effects

on what is procured, as was evident in the case of the B-1 bomber which was produced after being actually canceled by President Carter.

One way that threat issues are discussed today is in terms of “capability”.

Because there is no overriding threat now as there was in the Soviet days, people often use capabilities to imply a more generic, less threat specific environment. While this is a positive effort to get away from an old cold war mindset, it is not a departure from the threat concept. If one speaks of capabilities, one is really speaking of an ability to do something in the world in the face of some form of generic opposition. That brings us right back to threats.

The bottom line is that when it comes to acquisition, futures estimates are important in shaping and justifying programs that at times can be extraordinarily expensive and important to our national security. While they may seem to be shrouded in mystery and performed behind closed doors, they are just products of people working through a process, and they are subject to the same forces that influence any human endeavor so constructed. There is actually very little mystery in the process, as is discussed next.

Looking for Patterns

Often, and practically always in the beginning of any new effort, intelligence work is inductive. Analysts infer existence from fragmentary data to create useful concepts and estimates about what is happening. A bit of information from a person here, a photograph there, a sense that activity at some location was increasing or changing: it all added up to something. Over time, some type of understanding would

evolve in the analysts minds about how business was conducted. After looking at something for a long time, patterns would emerge that facilitate production of an overall estimate of developments.

At some point, as information grows and grows, intelligence work can become deductive. Conclusions can be based upon concepts or formulas of production and capacity, or founded in trends in technology, or supported by systematically produced general concepts born of long observation or some combination of all the above. Analysts go from the general case premises to specific estimates that are considered valid because they conform to previously understood conditions. That was particularly true of the Soviet Union. As government spokesperson Jack Snyder said of the Brezhnev era, “...our eyes glazed over from the tedious sameness of East-West relations.” (Taylor) While some people may have found this boring, it was a tremendous help to futures forecasting about the Soviets.

“The Good Old Soviet Days”.

For those in the business of producing estimates, the Soviet era was the best of times in many ways because intelligence work was critical, interesting, and a consuming avocation. It was based on long term observation through as many different lenses as possible. As time passed and expertise grew, analysts observed that certain definite and clear traits began to emerge in Soviet weapons development cycles and operations.

The Soviet Union was a planned economy first and foremost. While one may not have known what the classified defense plans were, it was quite probable that the new five year plan was similar in many ways to the old five year plan, and glimpses of the old

had been seen. There was a long history, for example, of regular aircraft development. When one fighter was rolled out, one could be fairly sure that another was on the way and would soon show itself at a test facility, a production plant, or a flight line. The new fighter's performance could be estimated based on simple, historically derived projections extrapolated into the future. As preliminary details became clear, such as size, mission, etc. other details could be filled in to the point of having a workable understanding of the general nature of the aircraft and its capabilities.

The planned Soviet economy seemed to have been operated by bureaucrats with fixed planning templates for any particular production cycle. To an observer, it seemed that Soviet planners would put their templates down on a time line, draw in symbols and marks for major events, and mark a project completion date with the end of the template. Then, when a new model or version was needed, the bureaucrat would take out his trusted template and repeat the process all over again. After a while, one could observe enough planning and production cycles to reproduce a reasonable facsimile of the template. One may not know the exact details, or even the most basic information in many cases, but one at least knew about when and where to look. It was the same for ship building, and many other large items. Over and over, large ships would take shape in repeating patterns at the same shipyards, and the future could be predicted with some degree of accuracy. This was not Soviet unique, for we do the same thing plus we throw in public debate as an extra measure. But in the Soviet case, the regularity was striking.

If one knew that it took 12 years to design, build, and deploy the last system, and that there was usually about a 4 year period between introductions of new systems, then one could reasonably outline an estimate for any given number of years into the future.

While forthcoming technology and performance levels were not clear in the beginning, we were helped by the fact that there was regularity to their efforts based upon long term linear planning. Furthermore, Soviet linearity was also a big help when it came to estimating numbers.

Linearity directly links results with efforts - the more you put in, the more you get out. Kick a ball powerfully and it goes farther than when kicked softly. The Soviets were famous for massed weapons - the case for quantity over quality. Lenin's maxim that "quantity has a quality all of its own" was taken seriously as their asymmetric response to high quality US weapons. While the US would replace a number of older, less capable systems with fewer more capable ones, the Soviets often wouldn't. They tended to replace older, obsolete systems on a one-for-one basis, or close to it. And some times, they would even keep the old system around for additional service until it was worn out. Understanding that principle made it relatively straightforward to approximate numbers.

Collection

Certain information collection options proved to be more attractive than others in dealing with the huge, highly secretive USSR. Manned over-flights were attractive initially, but ended with the Gary Powers/U-2 shoot down. Subsequently, space based overhead collection systems became the preferred option because they could not be interdicted at the borders; they were not as intrusive as overhead flights, and they were reliable. They had the country coverage needed to show developments across the region. Consequently, vast sums of money were spent for secret overhead systems by what is

now known as the National Reconnaissance Office (NRO). But while overhead systems were wonderful for seeing physical objects on the ground, they were woefully inadequate for determining other things.

“No intelligence channel carries all the messages needed by governments.” according to Wesley Wark, who adds: “and the result of overreliance on technological wizardry can be complacency, even blindness to threats.” (27) Possibly, heavy reliance on overhead systems had something to do with the intelligence community’s blindness to what happened to the Soviets. The collapse of the Soviet Union, one of the most remarkable events in modern history, was not foreseen by the intelligence community despite massive effort to observe the Soviet system.

One Man’s Experience

When Lt. General Rokke (currently head of the National Defense University) was assigned to the Moscow Embassy as an Air Attaché, one of his primary duties was to report back about what was going on in Russia. As he has publicly related, he was sending back reports about how many tanks, airplanes etc. he thought the Soviets were building, and generally doing what he thought to be a complete job of keeping track of events. Interestingly, his wife did not see things in anywhere near the same way. according to Gen. Rokke.

She had to deal with the economy from a consumer’s point of view, and she saw things totally differently. As a consumer, she complained that “these people can’t produce anything” after returning from unsuccessful shopping trips in downtown Moscow. She could not even find the basics, despite being in a far better position than

the average Russian to get what she needed to run a household. Yet Gen. Rokke kept sending in his reports about all the military production based upon what he was seeing, never considering that the Soviet system was about to collapse. Both Gen. Rokke and his wife were right in what they observed, but Gen. Rokke never linked the two into a bigger picture. While he is remarkably candid in his description, one must also remember that he wasn't alone. The whole community missed it.

Life in Lean, Post - Soviet Times.

On December 25, 1991, the Soviet flag was lowered over the Kremlin for the last time as the Soviet Empire fell. In the intelligence community, particularly in DOD, there was a sense of relief mixed with nostalgia and concern. The relief was for the end of a long, dangerous, and expensive war conducted over almost a half century. The nostalgia was in recognition that the one central, uniting cause that focused all our energies was gone. The concern was acknowledgment that we would have to change, and part of that change could be job losses. As Soviet Spokesperson Georgy Arbatov put it, "We are going to do a terrible thing to you - we are going to deprive you of an enemy!"

DOD Downsizing and Intelligence

With the Soviet disintegration, US military budgets were reduced to reflect the new world order - a process that continues today. Simultaneously, as reported by Clarence Robinson, intelligence customers began clamoring for faster, more diverse and accurate analyses (21), while Robert Ackerman reported that new customers were being

added as intelligence users. Furthermore, he highlighted non-traditional targets such as environmental issues and foreign economies that have also become the concern of intelligence gathering. (45)

As the intelligence community was squeezed by reductions and stretched by expanded missions, it became apparent that previously overlapping functions and their associated personnel costs had to be significantly reduced or eliminated. The concept put into place to deal with these changes was called “Lanes in the Road.” Individual services’ intelligence agencies were forced to focus only on their primary areas of responsibility and abandon efforts in related side interests.

“Lanes in the Road”

DIA used the term to signify that each service intelligence agency was assigned certain areas of responsibility, and in those areas the designated agency would speak for the community as the recognized expert. Army intelligence, from the National Ground Intelligence Center (NGIC) in Charlottesville, Virginia, would speak to issues associated with ground warfare. The Air Force’s National Air Intelligence Center in Ohio would be the designated center for expertise for air warfare technical issues. The Navy, with its National Maritime Intelligence Center in Suitland, Maryland, would address issues dealing with war at sea and other related maritime topics.

This structure seems reasonable in concept and appears to work well for many issues. But there are problems. Having each service project the threats it expects to face in the future raises issues of conflict of interest, somewhat like asking the fox to guard the hen house. If a service wants to justify a program, and if that service also produces

the threat projection upon which the program will be based, then there is possible motivation to inflate projections to the level needed to support proposed acquisition programs. Whether or not it actually occurs, and whether or not it is intentional if it ever does occur, there is no escaping the appearance of conflict of interest. Any concept of checks and balances in forecasts is lost under the streamlined approach.

Additionally, there is another problem caused when missions overlap but lanes in the road do not. Under the lanes in the road concept, one service can have a clear lane in the road to do analyses and projections in an area that significantly overlaps and affects another service. For example, when the Air Force issues threat projections for air systems, those projections also effect both Army and Navy aviation programs. Yet neither the Army nor the Navy have designated responsibility for air threats so no resources, neither funds nor people, are allocated to the Army or the Navy to study an area of major concern to them. While it is a natural fallout of reduced budgets to cut overlap, services are left without any say in an area of potentially critical mission importance.

Different Interests

Concerns over perceived or potential conflicts of interest in defense intelligence are not helped by the fact that the head of DIA is an active duty flag officer nominated for the joint job by the individual service. Whether or not bias actually creeps into projections is not as clear as the appearance that it certainly could. Similarly, there is an inherent fear at lower rank levels of what Abram Shulsky calls “killing the messenger” syndrome.

Killing the messenger is the tendency to blame the messenger for bringing unwelcome news. In rare cases, it involves analysts willingness to do and present work that does not support the service's favored policy position. (152) This has a chilling effect on what analysts are willing to do, and tends to cause individuals to keep silent when confronted by an organizational position about a policy or program not consistent with analyses. The most common tendency is to simply let others who are more in agreement carry the issue forward. And with the seemingly interlocking directory of service members at the top of the organization, there is no intrinsic pull to get analysts to speak against favored programs.

Similarly, there is a bureaucratic incentive to project threats. Bureaucracies want to live and grow, and intelligence organizations and the people who man them are no different. You get attention from your superiors and from the acquisition community because of what you project, not because of what you don't project. If an analyst supplies a "good" assessment in an area of interest to a major acquisition program, the analyst is appreciated. And the organization is appreciated. Conversely, if an analyst stands up and says that there really isn't anything going on in a certain area, neither the analyst nor the organization gets much attention.

Before "lanes in the road" each part of the intelligence community pursued areas that interested and involved them, even if others were also doing related work in the same area. The overlap provided a wealth of technical experience and different perspectives on common problems. If one agency was working on something that affected others, the others would pitch in to share expertise when appropriate, thereby producing more balanced products where all service interests were protected. This

sharing stopped with the new philosophy and defense cutbacks. Significant cooperation has ended because organizations were manned and funded to do only their specific duties. Agencies stopped being willing to help others because budget cutters might discover any analysts working on tasks outside the agency's designated lane and cut them accordingly.

Consequently, even if another agency could help, many times they don't want to for fear of giving budget cutters an excuse. For example, futures estimates for defense purposes are currently recognized as DIA products, not intelligence community products. Consequently, intelligence agencies outside of DIA are not motivated to be involved even though they may possess extremely valuable information. Futures projections do not intrinsically generate community support because they are considered a DIA problem, but projections may be flawed unless they represent a complete intelligence community view. The overall result is a general loss of checks and balances, and an increased ability of a small group to introduce parochial views into estimates that do not receive adequate peer review.

Personnel Issues

As our national interests expanded to more countries world wide while intelligence staffs were reduced, analysts responsibilities changed significantly. Many analysts had their areas of responsibility enlarged or completely shifted into unfamiliar subjects. The accumulated experience and knowledge from past decades was lost as focus changed. As people are not plastic and can not be molded instantly, there is no quick way to reestablish expertise. Old analysts who understand how to do intelligence work in general can pick up new areas, but it takes time to get the lay of the land and a

feel for what is going on. That can cause real problems when combined with the “Lanes in the Road” concept.

Reassignments. The need for in depth study of almost every aspect of Soviet military operations vanished. Many Soviet analysts were reassigned from areas they thoroughly understood to new regions and new areas of US national interest. They had little experience, but were still required to produce assessments as they matured in the new study area.

When it is time to do a country assessment, there is no way of knowing who will show up at the meetings. Sometimes, an assigned analyst may have a lifetime of work and experience in the region. Sometimes the individual may have almost no expertise or valuable background. He/she may have simply been the best available person the organization had to send at the time. So under the “lanes of the road” concept, the newly assigned analysts may be tasked to develop and represent the primary DOD and intelligence community position, yet they may have relatively little knowledge about the area.

Personnel Downsizing. People have been thinned down over time, in some cases by as much as 25% for some agencies, and greater reductions are expected. In fact, some end strength goals for 1996 and 1997 are expected to be especially tough. Rather than go through a difficult Reduction in Force (RIF), most agencies stopped hiring some time ago to reduce personnel levels through normal attrition. DIA is proud of the fact that they have not had to RIF anyone. However, the flip side is that there has been no meaningful hiring for several years. While no hiring brings the benefit of not needing to train and integrate new people, there is now a skewed work force population

almost exclusively composed of highly experienced analysts from the Soviet days. There are no young replacements working up through the system. As related by Katherine McIntire Peters, it is going to get worse before it gets better. "In the next 10 years, nearly half of [DIA's] civilian employees could retire... Budget and personnel cuts, a revolution in technology, and the end of the Cold War have converged to force a major shift in the way DIA does business." (P20, Government Executive, Nov. 1996)

Furthermore, it is the old retiring analysts who had military experience, not the younger workers. 40% of DIA had military experience just a few years ago; today that number has fallen to 30% and it is expected to continue to fall.

Loss of Scientific and Technology Focus. During the Soviet era, significant emphasis and effort was placed on studying Science and Technology (S&T) to avoid technological surprise. That changed with the new world order. Now, there are more countries to study, and the few having serious technological capabilities are mostly allies. Furthermore, most of the weapons being supplied to the world's arms markets are from the West - mainly the US. So an area previously of prime intelligence interest was severely reduced, and people were reassigned to less technical and more operationally oriented areas. This reassignment to new areas, coupled with the lack of hiring of new personnel, combined with massive upcoming retirements will make interesting personnel requirements and intelligence production problems in the near future.

Additionally, as Mary McCarthy reported in her article on the National Warning System, when analysts are involved with normal day to day, short term production, they are less able to detect and understand long term issues and changes. Current intelligence, she noted, is the enemy of reflection, research, or sophisticated analytical techniques. It

is the same the world over - creativity and imagination are struck down by the tyranny of deadlines. (13) Loss of Scientific and Technical emphasis will have effects that will only become apparent over time. But once they are in evidence, the loss will be painfully difficult for future intelligence and slow to repair.

Loss of Feedback. Projections take a long time to unfold. They are built on assumptions that may or may not come true, and knowing how to craft them is considered something of an art. If the analyst is not around long enough to get feedback about his projections, he has a hard time learning how to improve them. Further, if he is not accountable for the quality of his estimates because he knows that he is leaving, then he is potentially more easily swayed by political and practical concerns than the estimate quality itself.

Lack of Structure. There is very little structure for doing an estimate. A group of subject matter analysts is gathered, assembled, empowered, tasked, and turned loose. The first thing they usually do is take a look at what was written in the past, and then based on their collective and individual opinions, decide to change some or all of the material as circumstances require. If there was no previous assessment, then they start from scratch. In other words, there are no structural or procedural aids or process available to guide the process beyond the experience of the assembled personnel. So the estimate produced is highly dependent on many of the personnel issues previously discussed. As might be imagined, the results produced by such a set-up can vary significantly from year to year with disruptive results.

Loss of Assessment Continuity. Without commonly structured guidelines and organizing bounds for producing an estimate, new updates to old estimates have the

potential to take large variances from previous years without correspondingly large changes in intelligence information, a highly disruptive situation for the acquisition community.

If an estimate is significantly different from past estimates, for example, it changes the basic approach acquisition managers use to design their products. Schedule, cost, and performance can all be affected by a radically altered country assessment. When the intelligence community significantly changes opinions about what will happen in the future without being able to show significant new information to support the change, the news is not received well. The acquisition community can understand changes made based upon a new information set, but they have a hard time understanding the explanation that it was just a new group of analysts taking a new look. When several years of relatively stable projections are suddenly reversed without new information, then everything becomes suspect and intelligence credibility is damaged.

Philosophical and Conceptual Problems – An Inability to Predict.

Predictions are tremendously limited in their usefulness, regardless of all measures taken to make futures estimates as good as possible. These limits are particularly important when deciding how to use and integrate estimates into an acquisition process. But this isn't just an intelligence estimates problem. All people use their intellect and experience to discern the future as best they can by looking at the past. George Saytayana's wisdom prevails: "Those who can not remember the past are condemned to repeat it." Unfortunately, the limits on what can be done are not well or

clearly understood. Said differently, Saytayana's observation is applicable in some ways, but terribly misleading in others. Consider baseball, for example.

If you hit a pop fly to the second baseman, and if he catches it, you're out. That is the rule. It remains the same day after day, so batters must learn to do better than just hitting pop-ups. Here, Saytayana's view of history is applicable because the game rules are constant. But what happens when there are no rules, or when the rules change?

Baseball, like everything else in the country, used to be segregated. How does the past help predict a man like Jackie Robinson? Baseball used to be the "Nations' Pastime." How does the past help explain the rise and commercial dominance of integrated professional football as the nation's number one sport? It doesn't. And its usefulness is further diminished as one considers greater periods of time and greater degrees of complexity. For example, consider economics. When speaking of economic projections, Paul Krugman said:

Anyone who confidently predicts what the next generation will be like is either foolish or dishonest, for if we learn anything from recent history it is how completely wrong expectations can be. In 1947 most economists were pessimists, expecting the return of mass unemployment. The extraordinary growth of the next 25 years surprised them all. In the early 1970s, by contrast nearly everyone was excessively optimistic. None of the major economic difficulties of the 1970s and the 1980s - the energy crisis, the productivity slowdown, the rise of European unemployment, the debt crisis - was foreseen. So history teaches us to be humble and to entertain a variety of possibilities." (205)

When talking about military projections, we have assembled a similar track record. According to Robert Crowley, a noted military historian and writer:

The chief lesson of military history may be that there are few lessons, and that even those are intimidatingly elusive. History no more repeats itself than snowflakes replicate. The past is a foreign country, and we probe its frontiers at our own risk. (xi)

We are extremely poor at predictions, according to David Brinkley who gave several of his favorite examples:

- Lord Kelvin was a great, 19th century physicist who predicted: “Radio has no future.”
- In 1899, the head of the US Patent Office declared: “Everything that can be invented has been invented.”
- Abraham Lincoln, in 1860, said: “The South has too much sense and good temper to break up this union.”
- Adolph Hitler’s nephew said: “My uncle is a peaceful man.”
- In 1977, President Jimmy Carter said: “Iran is an island of stability in the Middle East.” (56)

Certainly there are valuable lessons to be learned from the past as a way to understand the forces that shaped the present and could form the future. As a rule, we don’t have significant problems researching major historical events or simply projecting significant past trends forward into the future. The challenge is managing the tension

and conflict between relatively straight-forward extrapolation into the future, and looking for new and different trends and forces for change. As will be discussed in the next section, the difficulty is recognizing the effective change agents, the new forces at work in a dynamic world that could alter the directions events might go, estimating what they might do, and then assigning each a probability to reflect the inherent uncertainty.

Systemic Problems

Why are projections so hard to get right? Is it just the people? A lack of training? Or something greater?

Organizational theory teaches that if you keep running into the same problems over and over, if the same issues keep resurfacing again and again, then there is a high probability that it is the system that is at fault, not the people. The entire community did not miss the Soviet collapse because everyone suddenly lost consciousness; it missed the collapse because intelligence did not actively consider the possibility. The Soviets had been going down the same path for so long that the intelligence community never could seriously predict that the wheels would finally fall off the wagon, much less the day it would actually happen. And, unfortunately, the same was true of the fall of the Shah of Iran, another big intelligence miss. Which raises the key question of how to do better.

Looking for Solutions

The Enabling Conditions - Covering all the Bases.

To illustrate how the present estimate process meets the decision maker, consider the following hypothetical situation. Imagine yourself as a very senior DOD decision

maker about to make a major procurement selection among competing, alternative systems. While you would like to select the cheaper alternative and free up some money for another much needed procurement, you are concerned. You are especially worried about one particular country which is a growing power and an increasing threat. This particular threat may cause you to steer towards the more expensive and robust system option. To get the latest information, you ask your local intelligence representative for the most recent futures estimate for that country.

Now imagine that the estimate you requested has just been delivered and you are viewing it. You look at the numbers, the columns and rows by weapons area, and you note the force structure projected. You notice that the estimate continues to show an upward trend in force structure and capability, an overall increasing threat over time.

You review the threat projection, look at the trends, ponder the alternative programs, and start leaning toward procurement of the more capable, though more expensive system. While this is almost universally the point where others stop digging, you pause to ask yourself some questions about the estimate.

What does this estimate really mean? Does it represent what intelligence really thinks will happen? Or is it the most dangerous option, the worst case, the one most critical to our national security? Are those two the same? So you ask your local, friendly intelligence representative.

He answers that the assessment represents the best intelligence community judgment and the authoritative work defining by year and by system the future for that specific country. At first, all seems fine as far as it goes since the secret world of intelligence had spoken, and since there was no little dog named "ToTo" to pull away

any curtains revealing an actual human being. But after some reflection, you decide to dig more by trying to see if there are additional factors involved beyond one smoothly presented answer.

You turn to the front of the document and point to a list of several key assumptions that were part of the assessment, and you ask your faithful intelligence officer to tell you about them. He replies something like this: “Those assumptions are needed to narrow down the estimate to something we can deal with. Our job, as we have been repeatedly told, is to provide you with our best shot about what we think will happen, and that is what we gave you.” You thank him, and he disappears while you review the assumptions listed.

You notice that there are six of them, and that they all seem quite reasonable; although, you suspect some are more valid than others. You decide to collectively refer to them as the estimate’s “enabling conditions”: the conditions that must exist for the estimate to be valid. For simplicity, you notionally assign each enabling assumption a 2 to 1 chance that the assumption will prove true over time. Having done that, you ask yourself the next question. What is the probability that the enabling conditions will actually occur? The answer is $0.67 \times 0.67 \times 0.67 \times 0.67 \times 0.67 \times 0.67 = .09$ or about 9% of the time.

According to your quick analysis, the conditions required to enable the estimate to be valid will occur 9% of the time. Or, from a different point of view, the document you are holding represents what won’t happen 91% of the time.

Somewhat surprised, you go back to the assumptions. You line out one assumption that doesn’t seem significant, reducing the total number of assumptions to 5.

Then you assign an overall, average probability of 0.8 or 80% to each of those five cases - a good bet in real life! What is the probability now that the requisite conditions will occur? $0.8 \times 0.8 \times 0.8 \times 0.8 \times 0.8 = 33\%$. Now, enabling conditions will occur one-third of the time, and those conditions will not occur two-thirds of the time.

Now what do you think of the estimate? What do you think of your decision to go with the expensive option? How are you to know what to do?

To see how your numbers coincided with intelligence's probabilities, you ask your intelligence officer for his probability assessments for each of the assumptions. But, he replies that neither he nor the analysts who created the document have such probabilities because they have never asked for them before. Never? No, never as far as anyone could remember.

Intrigued, you ask him to explain the nature of the other possibilities that make up the region that covers somewhere between 67% to 91% of the estimate according to your numbers, the vastly more likely area of occurrence. He doesn't have that information either, and for the same reason. So you ask him to return to the analysts and get the information. Being service minded, highly dedicated and thoroughly motivated, he returns in a matter of days. (Remember, you are very senior.)

He presents you with a range of options and their probabilities. Immediately, you see that the case originally presented in the assessment is still the most likely option to occur of all the options. But, you notice something else; this time there are lots of other options included. You observe that many of the other options, which totaled up to a much higher probability of actually occurring, represent a substantially more benign

environment, and in some cases actually a peaceful environment, all of which favor the less expensive solution.

You now have a much better picture of what intelligence really thinks. No longer locked into a single alternative solution, intelligence was able to convey the uncertainty and probable options for future development. You are now in a far better position to make your decision that will steer the defense community.

Now your eyes fall on some of the other intelligence estimates produced for other countries, and you imagine the discovery sequence you just went through repeated over and over with other country estimates. You remember that one of the most common complaints about intelligence estimates is the old question, “Why are the bad guys always 10 feet tall?”. You know the bad guys aren’t 10 feet tall, and never have been, but that was the only choice previously discussed. Why? Now you think you know.

Patriotism and Estimates

Intelligence analysts often believe that their job is to outline in the assumptions how events could stack up against the US, and then show what that would mean in force structure. That is very different from asking what they think really will happen. When asked about what they think they are producing, the common response is to wrap the process in the American flag and add a pinch of Sun Tzu for extra flavor. “It’s our duty to tell the people about this possibility, and besides, ‘He who sweats most in peacetime bleeds least in war.’” Analysts get trapped into believing they are doing a patriotic deed of helping to protect the country by conscientiously avoiding underestimating the enemy. So they never do. The challenge is to change the system so analysts can feel less like

traitors if they consider a peaceful possibility such as the Soviet Union might indeed be collapsing.

And the reciprocal is true - things could get much worse, and analysts need to be free to consider all those possibilities as well. For example, in the '73 Israeli-Arab War, Israeli intelligence did not consider it possible for the Egyptians to attack. If they had been required to intentionally and carefully list their reasons, maybe someone reading it would have recognized a pattern of groupthink, a dreaded disease in intelligence that can destroy objectivity and awareness of possibilities. Maybe surprise could have been prevented. Discussing options is necessary and vital; it is hardly disloyal.

Options, Probabilities and Clausewitz.

Presenting options is not new in intelligence work. . Different ranges of force levels have been used to shown a range of uncertainty in the estimate. However, futures assessments have not included any probability estimates for the enabling conditions. Each assumption is an option, not a fact, yet the probability associated with it is never discussed. However, the importance of probabilities in predictions has been known for years; Clausewitz himself wrote of it.

In On War, Carl von Clausewitz espouses a view of warfare that is difficult to follow, and impossible to characterize in a few simple rules of war. Alan Beyerchen, in his groundbreaking article, "Clausewitz, Nonlinearity and the Unpredictability of War" ascribes the difficulty of reading Clausewitz to the idea that Clausewitz saw war as a nonlinear event. Being nonlinear, war had to be studied in detail, not in a macro sense aided by rules of behavior and conduct that would simplify events for the student.

Beyerchen contends that On War “denies many of the fundamental preconditions of theory such as - simplification, generalization, and prediction, among others.”

Clausewitz’s view of war is that it is a “nonlinear phenomenon, the conduct of which changes its character in ways that can not be analytically predicted.” According to Beyerchan, Clausewitz goes on to say more:

... in a profoundly unconfused way, he understands that seeking exact analytical solutions does not fit the nonlinear reality of the problems posed by war, and hence that our ability to predict the course and outcome of any given conflict is severely limited.

Beyerchen goes on to say that for Clausewitz, war is an “interaction.”

“The course of a given war becomes thereby not the mere sequence of intentions and actions of each opponent, but the pattern or shape generated by mutually hostile intentions and simultaneously consequential actions. The contest is not the presence or actions of each opponent added together. It is the dynamic set of patterns made in the space between and around the contestants.... It is obvious in a match between two wrestlers, which is how Clausewitz himself suggests we imagine the [struggle] between opponents in war: the body positions and contortions that emerge in wrestling are often impossible to achieve without the counterforce and counterweight of an opponent.

Clausewitz continues to say that actual war always occurs in a context, through a series of interactive steps that take time, and that none of those individual steps is absolutely final in and of itself. Thus he concludes that wars must be considered in a historical context, subject to historical contingencies. Therefore Beyerchen asserts that Clausewitz “concludes that the theoretical basis for prediction of the course of a war dissolves from analytical certainties into numerical probabilities.”

Clausewitz is saying that there are too many variables to allow accurate predictions about the nature and outcomes of war. He cited the “fog of war” as one contributing example that would not allow for precise predictions. Consequently,

instead of predicting a single “solution” to an estimate or study, Clausewitz believed that “numerical probabilities” need to be addressed. Today, as Clausewitz suggested, we need to let our analyses reflect probabilities, not certainties. Had Clausewitz been alive today, he would have been drawn to the New Sciences, particularly Complexity and Chaos Theory, and the idea of non-linearity.

From Linear to Non-Linear

The Soviets. When dealing with the Soviets, we routinely treated them as a linear entity. As discussed above, we could characterize the Soviet threat in terms of their own 5 year plans, templates for production, a centralized and planned economy. With significant study, intelligence could predict what was going to be happening in the short run, and refine that prediction over time. We did not know the specific nature of each development or how advanced their individual technologies had become, but we did have a good understanding of the broad issues like general process duration and overall trends in technological emphasis. That made applying linear predictions relatively easy. Make some assumptions, draw some lines, do some extrapolation, and an estimate was born. That’s how we missed the Soviet Collapse.

We missed the collapse because it was a non-linear event, and we were accustomed to dealing with linearity. We missed it because we were not doing systems thinking. We were seeing parts of the problem, not the whole. In fact, we never really discussed the entire possibility as a realistic option in our assessments. We never gave ourselves the opportunity to make such a broad assessment because we were way down in the interior of the problem.

The arms race between the US and the USSR was, in the words of Peter M. Senge, a race that lasted for 40 years between the two mightiest political powers to see *who could get fastest to where no one wanted to go.* (Italics mine) Yes, the confrontation did work for us in the end, but “It drained the US economy and devastated the Soviet economy...and terrified two generations of the world’s citizens.” (Senge, p70) We were both caught up in it, Senge said, because of the way both sides thought about the race:

From the American side: USSR arms produced a threat to Americans, so Americans needed to build arms because the Soviets were aggressors.

From the Soviet side: US arms produced a threat to the Soviets, so the Soviets needed to build arms because the US was the aggressor.

In other words, according to Senge, the two, individual straight line national solutions seemed to be linear solutions individually, but they became non-linear when viewed together as a system. Together, the two straight lines bent around to form a circle. That circle made for a perpetual cycle of fear and procurement, pushing both countries to adopt extraordinary positions dependent upon the other, just like the wrestlers in Clausewitz’s writings. The two countries adopted positions that neither could have attained had it not been for the other. And the positions were counterproductive.

By doing what seemed right to ensure security, each country actually heightened the world’s insecurity by producing stockpiles of nuclear weapons capable of countless iterations of “rubble bounce”, as it has sometimes been called. In other words, Senge says, *“doing the obvious thing does not produce the obvious, desired outcome.”*

Senge points out that neither side took a systems view despite an abundance of “systems analysts” and complex computer simulations. All those tools and people were

designed to handle the details of complexity, not the dynamics. That is why all the sophisticated tools of forecasting and analyses as well as elegant strategic plans usually failed to produce dramatic breakthroughs in thoughts. One can question whether or not any breakthroughs were possible, and indeed it seems that none was possible once both sides had entered into the contest. Certainly Senge never suggested on once the situation developed. Instead, he focused on how we got caught up in a situation that was ever more dangerous to all of us as long as it continued. And he proposed a reason for it in the concept of dynamic complexity.

Dynamic complexity occurs when a single action has one set of consequences locally and a very different set of consequences in another part of the system. When obvious interventions produce nonobvious consequences, dynamic complexity exists. The dynamic complexity for the Soviets was that they were working to ensure their own survival through arms procurement in the short run, while destroying their country in the long run by engaging in an enormously expensive arms race.

Today's World. Today it is easier to view the world as nonlinear and complex. Mentally we are no longer locked into a bipolar view, so acknowledging multiple levels of interaction is easier to do. But that hasn't made life simple, far from it.

We are dealing with highly complex systems and sometimes chaotic conditions. The old ways of linear analyses are even less useful today than they were before, yet we keep trying because they can be so helpful. We know that if we sufficiently reduce the time increment, if we make enough assumptions to make the problem linear, then linear analysis can still be extremely useful. The real problem for an analyst attempting

to predict the future is that the number of assumptions needed to make a linear estimate has grown dramatically because the world has grown ever more complex. And more assumptions mean a lower probability that the enabling conditions described will actually occur. For intelligence today, when providing a futures assessment, the inclusion of major assumptions and the estimated probability assigned to each is more important than ever because the possibilities are greater. This can be appreciated by briefly examining the New Sciences of Chaos and Complexity.

Chaos

Chaos theory is a recent addition to understanding our environment that takes up where the Newtonian rules of science end. Nineteenth-century physics, wrote David H. Freedman, was based on Newton's laws of motion, and on a direct cause and effect relationship. Scientists were confident they could reduce everything to a few simple laws (reductionism) and then make distant predictions about the future behavior of even the most complicated systems. Reductionists have ruled since Newton. Reductionism is the belief that by taking any system apart into its most basic units, and then examining each piece carefully, you can understand each part individually. Then, after understanding every part, you can reassemble all the parts back into a whole unit and know what it will do. This is the entire basis of many powerful analytical tools, not the least of which is calculus. When dealing with an engineering problem like design of an internal combustion engine, for example, reductionism is powerful. But reductionism by itself left huge holes in our ability to explain and predict many things, like a government and what it would do. As the old saw goes. "The whole is greater than the sum of its parts." More and more, scientists and others are concluding that this tradition of reductionism is

fundamentally wrong. The future is not predictable, but random and often unstable, which is where Chaos Theory is involved.

According to Maj. Glenn E. James, “The new science of Chaos examines behavior that is characterized by erratic fluctuations, sensitivity to disturbances, and long-term unpredictability.” (James, viii) Chaos theory describes a specific range of irregular behaviors that move or change, such as the apparently unpredictable behavior displayed by water flow in rivers, by oceans and by clouds. (James, 3)

The computer started it. According to Freedman, once scientists had the power to crunch huge sets of numbers, they discovered something fascinating. “An infinitesimal change in initial conditions could have a profound effect on the evolution of an entire system.” This was first discovered in the early 1960s by MIT meteorological scientist Edward Lorenz. He developed a computer program that simulated a weather program, and fed in numbers for initial conditions of wind and temperature. After the computer produced initial results, Lorenz was shocked to discover that even small changes to the initial conditions caused huge changes in the weather pattern. (For example, going from 4 significant decimal places to 6 significant places in only one bit of data in a huge data field) “In effect, a slight breeze in Idaho or a one-degree drop in temperature in Massachusetts would end up changing balmy weather in Florida into a hurricane a month later.” Freedman goes on to report that other physical scientists discovered the identical phenomenon - an infinitesimal change in the initial conditions could have a profound effect on the evolution of the entire system. (Freedman 26-29). The point is that unless you can *exactly* replicate the initial conditions, you can not know how the overall results will occur in a chaotic system. And in the real world, no one can

replicate initial conditions *exactly*, so with a chaotic situation, one simply can not say what will happen.

Chaos theory does not end with endless random patterns. Surprisingly, Chaos theory returns to the theme of predictability Clausewitz mentioned by introducing the concept of attractors. Attractors in Chaos theory can be described as the basic underlying forces that act on any system, according to John Casti. (Casti, 29-30.) Like the pull of magnets on a pendulum, like a stream of water carrying a leaf along, they determine in general how a system will act. Sometimes they are forces that draw objects and sometimes they repel objects, but they do so inside bounds that can be generally be discerned, if not precisely defined. This leads to the second important conclusion about nonlinear systems: patterns do exist beneath seemingly random systems of behavior. Attractors allow us to determine within broad statistical limits what a system is likely to do. “The cause-and-effect precision of traditional physics has been replaced by the statistical estimate of probability.” (Freedman 30)

Chaos theory adds immensely to understanding complex systems by viewing them from a holistic rather than reductionist perspective. Chaos theory advocates viewing the whole system as a system, not something to be dissected and analyzed. By viewing a system as a functioning whole, and by analyzing the actions of the whole, one can discern patterns and gain understanding not otherwise possible. If viewed broadly, chaotic systems display organization that is not externally imposed. They self organize in that whatever occurs does so inside bounds of behavior that can be recognized and understood. This leads directly to Complexity Theory.

Complexity.

Complexity and Reductionism. Like Chaos theory, Complexity theory does not deal with the world in a reductionist manner. Complexity theory goes beyond dealing with conditions of instability that vary endlessly depending on initial starting conditions. It looks at systems before they enter into chaotic conditions. It attempts to form an overall vision of the whole by looking at how the entire systems acts, not by looking at the nature of the individual parts. It looks for patterns of behavior and characteristics that can lead us to understanding and better dealing with the world. And it has come up with several interesting and applicable traits.

Self-organization. Without a central brain or control system to control behavior, individual systems self-organize by interacting with others in ways that can be extremely complex. For example, people attempting to satisfy their own material needs make decisions that unintentionally organize themselves into entire economies. Silicon valley is an example because it is the US capital of microelectronics, but it is not a capital because of some proclamation, but the result of a long series of individual decisions to group together for individual benefit and creative synergy. It just happened to coalesce in an area in California. Similarly, in almost every city of size, there is at least one area where car dealerships congregate. One would expect that car dealerships would be spread in some random order throughout a city, but it isn't the case. No one organized them or told them to settle in one predominate area, they did it individually based upon the feedback they were receiving and based upon their own self interests. Similarly, the entire society organizes itself as millions of people each made thousands of decisions.

There are plenty of other examples from nature: birds organize into flocks without being told how to behave by some teacher; 600 million years ago, individual cells began to form alliances that composed multicellular organisms such as seaweed, jelly fish, insects, and eventually humans. (Waldrop P10)

According to researchers and writers, these systems have several additional features beyond being self organized and self-managed. These systems can engage in cooperative behavior. According to Freeman (32), each neuron in the human brain is connected to millions of other neurons, and it is the interaction of these neurons that produces human intelligence. Like the flock of birds or school of fish, each neuron acts individually to form a cooperative unit, thereby improving the chances for all.

Feedback is important to self-managing systems. The human brain is capable of learning through feedback, and that learning is seen in the increased ability of those neurons that are used the most. Also, the human brain is constantly reorganizing the neuron connections in response to outside feedback. Complex systems are self-organizing as they respond to feedback conditions from the outside. Information is imbedded into the structure, and the system changes as that information changes. (Freeman 30)

Perpetual Novelty and Complex Adaptive Systems.

One of the building block tools used in Complexity Theory is the concept of the Complex Adaptive Systems. A Complex Adaptive System can be many things, and explaining them brings together many of the concepts of Complexity theory. The

following explanation is according to John H. Holland, as reported by M. Mitchell Waldrop in his book, Complexity.

Complex adaptive systems can be found everywhere. In nature, examples are brains, immune systems, ecologies, developing embryos, and ant colonies. In the human world, they include cultural and social systems, like political parties and scientific communities. The rate and magnitude of change in adaptive, complex systems is high. They constantly evolve as they create self-managed, but highly organized networks that respond to feedback from the environment and adjust their behavior. They learn from experience and embed that learning in the very structure of the system, and they reap the benefits of specialization without getting caught in rigidly imposed responses. For example, the stock market can be considered a complex adaptive system. It is self-organized as millions of different investors trade to establish prices. It learns from its mistakes and successes, and it is constantly changing with the times as situations, companies, investors and events evolve. Similarly, countries can be considered complex systems.

In countries, individuals act in accordance with their own interests. Furthermore, individuals band together to form areas of expertise and specialization. Individual as well as national events are remembered and embedded in the culture. The structure of countries changes over time as they respond to different events - borders, industries, governments, national priorities etc. The effects of outside feedback from other countries, from foreign markets and peoples, are incorporated and accounted. Nations are constantly organizing, learning and evolving. They are not and can not be static. All Complex Adaptive Systems seem to share several common properties.

First, each is a network of agents acting in parallel. Each agent can be as small as a cell in a developing embryo, or as large as a country in international trade. In business, it may be individual firms. In any case, each one finds itself in an environment produced by the interactions of the other agents in the system. An agent is constantly acting and reacting to what the other agents are doing, so nothing in the system is fixed. Furthermore, control of the system tends to be highly dispersed. The world economy can not be controlled by any country.

Second, complex adaptive systems have many levels of organization, with agents at any one level serving as building blocks for agents at higher levels. A group of workers composes a department, departments compose divisions, and on and on. Countries compose regions and regions compose the world. Significantly, it must be noted that complex adaptive systems are constantly revising and reordering their building blocks as they gain experience. Governments make new trading agreements or realign themselves into whole new alliances. The constant revision and recombination of the building blocks is this one key fundamental of adaptation of complex adaptive systems is that

Third, complex adaptive systems anticipate the future. Every complex adaptive system is constantly making predictions based on its various internal models of the world. Each has assumptions about the world, and they are called into action at appropriate times like subroutines in a computer program. They are the building blocks of behavior, and are constantly being revised and updated.

Finally, complex adaptive systems typically have many niches, and each niche can be exploited by an agent of the system adapting to meet needs. Thus, the economic

world has opportunities for computer programmers and plumbers, for steel mills and pet stores. Additionally, the very act of one agent filling one niche opens up opportunities for other agents to exploit other areas. New opportunities are always being created. Consequently, it is essentially meaningless to talk about a system being in equilibrium because the system can never get to true stability. It is not stable!

There is no point in imagining that the agents in a system can ever “optimize.” The total range of options available in a shifting world are too many to ever end in some static equilibrium. The best they can do is continuously change to improve themselves relative to what the other agents are doing. *“In short, complex adaptive systems are characterized by perpetual novelty.”* (my italics). (Waldrop)

Clausewitz would have loved it. Here is a modern, scientific examination of the world that can explain why there can not be absolute projections, only mathematical probabilities. Here is reason for not trying to use linear estimates for future projections. The complex adaptive systems don’t work that way. Instead, one must look for trends, changes in rates, instabilities, chaotic conditions, options, and probabilities.

Recommendations

The basic premise of this paper is that futures estimates from the intelligence community can be improved without reinventing intelligence. In this section, specific improvements are suggested to address the problems discussed.

Predict Probabilities, Not One Answer.

We must quit pretending we can forecast accurately because we know we can't. Since estimates will be wrong when we are limited to only one set of "take it or leave it" assumptions and resulting numbers, we must stop giving "the answer." The intelligence community must be willing to provide a range of alternative outcomes and their assessed probabilities. And it needs to be done in a way that does not bog the decision maker down in endless details and possibilities

From Complexity theory, we know that complex adaptive systems such as nations are never static, so key trends must be presented and analyzed. Probabilities must be assigned to the major assumptions and trends that compose the estimate so potential threats are accurately depicted. When conditions exist where no prediction is practical, such as the chaos that is currently ongoing in some areas of Sub-Saharan Africa, then we need to clearly state that the outcomes are not predictable with any degree of assurance.

Furthermore, when we think that some country under consideration is likely to be approaching a chaotic state, or that a chaotic state may occur at some point in the future, then intelligence must clearly point out the possibility so action can be undertaken as needed to either prevent it or minimize any resulting impact on the U.S. Considering the potential for disaster in Russia, China, North Korea, and the Middle East just for examples, identifying the conditions and possible actions helpful to minimize America's risks could be most important.

However, we don't have to do that for every issue. The cost of going more carefully into each assumption and consideration is increased time to produce and

understand the estimate. As personnel resources are going down and not up, this careful analysis will have to be limited to the most important issues. There are only a few key countries that are most critical to us, and for those estimates, the full analyses needs to be done to prevent misleading decision makers and ourselves.

Adopting probabilities will help change the intelligence culture. Presently, some analysts will not realistically consider that things could actually be getting better because they think that reporting good news isn't intelligence's patriotic duty. If they can only show one option, then who is going to provide one that could let down the country? This attitude can be overcome in part by forcing the community to list the key assumptions and evaluating confidence levels.

For Lesser Cases, Adopt Gen. Powell's Principle.

Not every case is sufficiently large to justify a complete options analysis by probabilities as described above. In that case, an abbreviated procedure needs to be available for analysts to present alternatives to decision makers. The one proposed here is based upon Gen. Powell's famous directive:

Tell me what you know,
Tell me what you don't know,
Tell me what you think,
...and always distinguish which is which.

Gen. Powell's directive can be adopted by using the titles and sections he provided as heading for the needed sections. First would be a section titled "What We Know." It would contain the relevant, known intelligence data at the appropriate level of detail for the assessment. By putting this information into one section, the reader is

informed clearly about what intelligence actually knows. Sometimes it is difficult for even an informed reader to accurately distinguish between fact and supposition in many of today's assessments.

The next section would deal with what we don't know. It would be an amplification of the information gaps that we face in formulating the assessment. This section would not be large, but would point out major areas where answers are not known to important questions about the subject under discussion.

Third would be the part discussing what the intelligence community thinks - the speculative and challenging part of the analyst's work. It would advance the analyst's major conclusions supported by the primary reasoning behind each conclusion, including facts, information, trends, and any other information the analyst wishes to provide defending the analysis.

Using this format would provide the reader with a clearer picture of the known information, experts' thoughts, and knowledge gaps applicable. And most importantly, each section would be clearly identified so the reader would be able to clearly separate fact from opinion. In the area of opinions, other options and possibilities would be listed before the section describing what the analyst thinks will happen. Providing alternatives will show a reasonable series of different scenarios for the reader to consider. This format provides an abbreviated way to complement the more complete and thorough procedure used in larger analyses.

Base Key Estimates on an NIE.

A National Intelligence Estimate (NIE) deals with a specific subject or country, and issued by the Director of Central Intelligence for the entire community with executive agency responsibility residing in CIA. It is a thoroughly coordinated document combining all aspects of intelligence community knowledge and understanding into the best possible overall picture. Before attempting a major defense intelligence look at a key country, defense intelligence should have a current NIE to work from. Abram Shulsky said:

Obviously, to manage military affairs and to conduct foreign policy, a country's governmental officials must know more about its potential adversaries than merely their military or diplomatic secrets. Other factors, such as the potential adversary's economic activity and potential, its demographic trends, and its internal political forces and concerns also must be considered. (181)

While it does seem obvious, it is often ignored. DOD routinely produces analyses that has not been reviewed by the combined intelligence community. Yet because the intelligence community is not organized with all knowledge resident in the Department of Defense, it is impossible to devise a complete country estimate without going outside DOD for the needed information.

Using an NIE would do more than just address the accuracy of projections: it would add credibility. It would provide a counter to the perception that DOD Intelligence Estimates are tools of the defense community to foster their own programs. DIA would still lead the estimate, so defense would still control the procedure, but it would be based upon all the information currently available and agreed upon by the entire intelligence community, not just the sometimes narrow defense perspective. This would hopefully

moderate the distrust and sometimes internecine warfare that has erupted over controversial, program related estimates.

Personnel Training

There is a tremendous need for training in the intelligence services today. While the people are not new, many of the positions they now occupy are new to them. Many analysts work in areas that were not of primary intelligence interest in past years. They need help, as DIA especially is aware, in traditional areas of intelligence study. Plus, some unusual training could be helpful for those specifically involved with estimates, such as training in Chaos and Complexity.

Chaos and Complexity theory gives a new, non-linear perspective view that aids world understanding. Clausewitz was right, and now we know why. There are rational and understandable explanations for conditions previously thought to be incomprehensible. A change of attitude and understanding will help open minds to better understand the future.

Modern Decision Support Center.

We have been doing estimates the same way right from the beginning. In previous times, we would assemble a cast of gray beards, the pipe smokers of old, who would reach into their deep memory banks to cast a vision for all to see and admire. And when time came to update the estimate, the same cast of characters would assemble year after year to review and update what was happening. They could themselves generate feedback by reviewing their past estimates in an attempt to improve.

Unfortunately for the quality and understanding of estimates, those times are gone. Today, the world is rapidly changing and new issues keep arising. The personnel situation is different in that the analytical stability of the past is not expected to return for many years, if ever. Fortunately, modern help is available to counter this developing problem.

A Modern Decision Support Center would help counter several of the adverse trends previously discussed. The center would be a structured way to facilitate assessments. It would be staffed by only a few personnel with experience in doing assessments who would help facilitate and guide the process. The facilitators and the support center would help analysts do the assessment, but would not be allowed to participate themselves. The facility would include a computer decision support systems to aid the process. Facilitators would have checklist or cookbook type processes and lists of items to be considered by analysts in forming an estimate. These would be suggestions to make sure that nothing major was left out of consideration.

It would provide modern, computer aided decision tools to maximize chances of producing quality assessments and to help the process become more efficient. For example, Ventana Corporation's GroupSystems software could be hosted in the Center. It could provide an efficient, fast, and flexible way of doing all the needed assumptions and probability analyses suggested in this paper. It is software that helps groups overcome many different problems in making group decisions, like groupthink, personal attacks, and fear of corporate retribution for independent thought.

The Center would have copies of the last estimates, as well as any other supporting materials considered in making the old projections. That way, analysts could

conveniently compare the old and the new to discern trends and identify changes. The Center would be the central coordination point to make sure that the right people were included in the estimate. By having coordination, the center could keep track of who from what organization should at least be contacted relative to any particular assessment. Importantly, this goes for representatives from outside of DOD as well as those inside the system.

The center would be the main control point for coordinating the appearance of outside, additional experts. In light of DOD downsizing and in recognition of the vast wealth of expertise outside DOD, the center would coordinate briefings and assistance by outside experts. While in the past this has not traditionally been done, there is such diversity and change in the world today that DOD can not hope to capture all the needed expertise for every country and region. Training time, new intelligence requirements, personnel difficulties plus the complexity and speed of change in the world today all support the need for increasingly involving outside expertise. This is especially important for countries that are culturally different than ours, for unless we understand the cultural context of the particular national decision maker, we can not be expected to understand what will be decided for the future. The decision center could coordinate the activities of outside experts as part of the estimates process. That expertise resides in the civilian community, and the Center could coordinate it.

Decision support systems could really help. Right now, because of cuts, some of the most important aspects of any country's national power are being analyzed by little functional offices of one or two people. The result is a case overload for the individuals involved and very shallow analyses of the countries involved. Especially hard hit are

areas outside of the normal defense domain because the few people involved must cover the all the significant countries in the world. Regional concerns, economic factors, and political considerations are all extremely important to a national assessment and a country's primary elements of national power. Yet with limited manpower, DOD can not cover the world and still perform its primary function of providing militarily focused intelligence and analyses.

By providing a more structured approach that will quickly move analysts through a more complete process, these key elements of national power will be better represented. For example, in producing an economic estimate and a corresponding military budget for a country, there could be generalized electronic worksheets to make sure that all the needed aspects for each country are at least considered and handled in a mathematically traceable manner. The military budget could be similarly broken out to show what was being spent on different national areas of interest and to ensure that all the needed parts received some of the funding. At present, it is difficult for anyone to know what budgetary amounts are needed to run the military in all the countries of major interest. For example, in countries like the Soviet Union that were not market based, not even the Soviets could give us a good estimate of what things cost because they didn't know. Similarly today we are still limited by less than fully market based systems and countries that are closed to us for political reasons.

Hopefully, by having at least some form of structured approach, we could a better grasp of what is happening economically, for example, in a country of interest, and we could start building an information base. This would possibly, for example, reduce the present practice of projecting huge sums spent procuring exotic systems while

projecting little or nothing spent on all the less glamorous items needed to actually field a military. At present, there is significant suspicion that a lot of the routine, unglamorous, yet totally necessary procurement is forgotten in favor of new systems. By establishing a structure and process to systematically address those estimates and learn from them, then improvements could be made and credibility established. Force planning, force budgeting, and life cycle costs tools are not new to the US military planning process because we have had to use them to make sense of our own numbers. We need to apply simplified versions of the same tools to the intelligence estimates processes.

Feedback

Our futures estimates don't receive feedback, so there is no way for them to improve. There is no feedback process, and with frequent changes in personnel and primary areas of interest, there is reduced learning through longevity. Instead of the stability of past years, we now have little chance to track estimates over the years to learn from the estimates process. The Support Center could improve the situation by keeping records and comparing projections with actual events since there is no present process to enable reviews of past estimates. We make no effort, neither have we any requirement to plot our estimating trends to see if our estimates tend to be conservative or wildly exaggerated. We have no process to compare what we said with what actually happened. Why not? If feedback is the food for improvement, the futures estimates process is starving.

Across Agency Review

Just as was done in bringing the community together for the underlying NIE picture of the country, the final product should also be reviewed by the full intelligence community to make sure it is not at significant variance with the established community position.

While it might seem likely that an internal DOD intelligence review process would be sufficient, in practice it hasn't always worked out. The problem is that presumably organizations initially sent their most knowledgeable experts to produce the analyses to be reviewed. So reviewers and organizations are often quite hesitant to make major revisions for fear of introducing errors. Consequently, as documents go up the various chains of command, they gain command weight behind the individual service or agency position, but often little in the way of detailed factual review and analytical refinement.

The second problem from keeping DOD intelligence estimates strictly in DOD channels is that sometimes DOD does not have the full picture. Specifically, DOD estimates have been made that assumed the US would act in a way directly contrary to publicly stated US national policy. There have been major country studies produced where DOD intelligence assumed that the US itself would act contrary to our publicly commitments made by the highest levels of our government. In other words, DOD assumed we would violate our own national policy. Similarly, to be fair to DOD, agencies outside DOD have produced estimates of other country's military related activities that DOD considered grossly beyond that country's capabilities.) To be clear, we are not talking about little transgressions or differences in interpretation, but huge

variances involving major issues. Using the argument that DOD projections should stay in DOD is shortsighted and irresponsible. Having all major intelligence estimates reviewed across government lines should eliminate this problem.

Conclusions

This paper differs from the more common attempts to improve intelligence in that it emphasizes the process and the product, not the organizational aspects. Five specific recommendations were presented to overcome a large measure of the problems noted. The changes envisioned are not major in any organizational way, yet they are significant in that they stretch across the full spectrum of activities. The most important change as far as the intelligence consumer is concerned is getting away from the single prediction method and mentality. It simply does not fit in today's world, if it ever did. Instead, we need to delineate probability bases alternatives for the key countries as an improved way of doing business and approaching futures estimates.

Country studies need to be based on National Intelligence Estimates. The community needs to come together to form a consensus view of the country in question. This will help eliminate some degree of parochialism and some of the criticism of DOD for not looking beyond its own interests. Similarly, once the estimate is produced, it needs to be reviewed by the non-DOD intelligence agencies for major areas of concern.

Finally, in a major change in the way estimates are done today, they need to be facilitated by a Decision Support Center equipped with several modern supporting features to improve the process. These would include overall frameworks to ensure that appropriate areas of concern were considered, outside experts involved, expert

computer decision systems available to support the process, and avenues for feedback available to improve the estimates process.

Finally, training is included as a key ingredient in improving how work is being done. Extensive personnel problems are starting to manifest themselves now, and many will only get worse as conditions continue to change. By aggressively starting training now instead of waiting, problems with the future workforce can be mitigated as new analysts are eventually hired to replace the departing waves of veterans.

Outside expertise from other intelligence agencies and from the civilian sector is needed. Analysts doing futures assessments must have the needed information even if that knowledge is not contained in defense intelligence. For the most part, that can be handled through the Decision Support Center where efforts and emphasis on better coordination outlined here should help.

But more is needed. Key questions remain about how we are supposed to discern foreign intentions and culture. How are we to gather the needed information? How are we to strike a balance between competing systems to provide us with the best informational return for the resources expended. Careful attention and study needs to address this problem in a comprehensive manner to collect and direct information into assessments. That is a major task for senior leadership.

Enacting some or all of the steps explained here is not guaranteed to correct all the futures intelligence problems. But the changes suggested could provide extremely positive steps, and they do not dismantle the present system. The changes estimated are seen as relatively inexpensive alterations to an important system that needs attention. The opportunity costs of poor estimates and poor defense decisions are too high to

ignore. As relative American military power continues to decline with declining defense budgets and as the defense dollars spent continue to be used for more and more non-defense needs, making the estimates as accurate as possible becomes critical. Getting the acquisition process started on the correct footing with good estimates is more important now than ever. And we don't have to reorganize to vastly improve the process.

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